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application:

Application No. S2001/0589

Date of Filing 26 June 2001

Applicant ALLIANCE INVESTMENTS LIMITED, an Irish
Company of Monksland Industrial Estate, Athlone,
County Westmeath, Ireland.

Dated this 21st day of May 2003.



Brian M. Keeney
An officer authorised by the
Controller of Patents, Designs and Trademarks.

8010539

FORM NO. 1

REQUEST FOR THE GRANT OF A PATENT

PATENTS ACT 1992

The Applicant(s) named herein hereby request(s)
[] the grant of a patent under Part II of the Act
[X] the grant of a short-term patent under Part III of the
Act
on the basis of the information furnished hereunder.

1. Applicant(s)

ALLIANCE INVESTMENTS LIMITED,
Monksland Industrial Estate
Athlone
County Westmeath
Ireland
an Irish Company

2. Title of Invention

A therapeutic bed

3. Declaration of Priority on basis of previously filed
application(s) for same invention (Sections 25 & 26)

Previous Filing Country in or for Filing No.
Date which filed

4. Identification of Inventor(s)

Name(s) and addressee(s) of person(s) believed
by the Applicant(s) to be the inventor(s)
To Follow

5. Statement of right to be granted a patent (Section 17(2) (b))
To follow

6. Items accompanying this Request

- (i) [X] prescribed filing fee (IRP 50)
- (ii) [] specification containing a description and claims
 - [X] specification containing a description only
 - [X] Drawings referred to in description or claims
- (iii) [] An abstract
- (iv) [] Copy of previous application(s) whose priority is claimed
- (v) [] Translation of previous application whose priority is claimed
- (vi) [X] Authorisation of Agent (this may be given at 8 below if this Request is signed by the Applicant(s))

7. Divisional Application(s)

The following information is applicable to the present application which is made under Section 24 -

Earlier Application No.

Filing Date:

8. Agent

The following is authorised to act as agent in all proceedings connected with the obtaining of a patent to which this request relates and in relation to any patent granted -

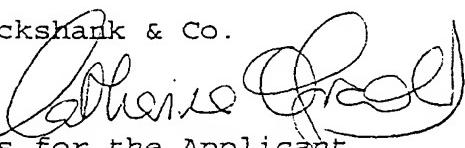
Name & Address

Cruickshank & Co. at their address recorded for the time being in the Register of Patent Agents is hereby appointed Agents and address for service, presently 1 Holles Street, Dublin 2.

9. Address for service (if different from that at 8)

Signed Cruickshank & Co.

By:-


Agents for the Applicant

Executive.

Date June 26, 2001.

TRUE COPY

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APPLICATION NO.

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- 1 -

“A Therapeutic Bed”

This invention relates to therapeutic beds, and in particular to prone positioning therapeutic beds.

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The invention particularly relates to prone positioning beds of the type described in our previous patent applications – publication Nos. WO 97/22323 and WO 99/62454 – the contents of which are incorporated herein by reference.

10 While the invention is primarily concerned with improvements to this type of prone positioning bed, some or all of the various improvements may have application to other types of therapeutic bed also.

Statements of Invention

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In one aspect of the invention there is provided a side rail assembly for mounting along a side of a patient support platform of a therapeutic bed, comprising a rail with means for mounting the rail on the patient support platform such that the rail is movable between an engaged operative position and a stored position on the patient support platform.

20

In one embodiment of the invention the rail is pivotally mounted on the patient support platform for movement between the engaged position and the stored position.

25

In another embodiment means is provided for supporting the rail in an intermediate position between the engaged position and the stored position.

In a particularly preferred embodiment in the stored position the rail locates beneath the patient support platform.

In another embodiment the rail carries a patient support pad.

Conveniently the patient support pad may be movable on the rail between an in-use

position extending outwardly of the rail a collapsed position against the rail for storage.

In another aspect of the invention there is provided a locking pin arrangement for
5 locking a patient support platform on a base frame of a therapeutic bed, said patient support platform being rotatable about a longitudinal axis of the bed, comprising a locking pin mounted on one of the patient support platform and the base frame for engagement with a complementary receiver on the other of the patient support platform and the base frame, the locking pin having associated position sensors
10 which cooperate with an actuator on the locking pin to indicate to a controller for the bed whether the pin is engaged with or released from the receiver.

Preferably also releasable retaining means is engagable with the locking pin to hold the locking pin in either the engaged or released positions. This conveniently may
15 be provided by a spring-loaded ball which engages in associated detents in the locking pin.

In another aspect the invention provides a therapeutic bed having a patient support platform rotatably mounted on a base frame for rotation about a longitudinal axis of
20 the patient support platform and means is provided for sensing the direction of rotation of the patient support platform on the base frame, said direction sensing means being connected to a controller for controlling rotation of the patient support platform, such that when the patient support platform is rotated in one direction between the supine patient support position and the prone patient support position,
25 the patient support platform is constrained to rotate in the opposite direction when returning from the patient prone support position to the patient supine support position.

In another aspect the invention provides a therapeutic bed substantially as herein
30 described.

Detailed Description of the Invention

The invention will be more clearly understood from the following description of some

embodiments thereof, given by way of example only, with reference to the accompanying drawings in which:-

5 Fig. 1 is an end elevational view of a rail assembly for a therapeutic bed according to the invention;

Fig. 2 is a side elevational view of the rail assembly;

10 Fig. 3 shows the rail assembly in an engaged in-use position;

Fig. 4 is an end elevational view showing the rail in an intermediate partially collapsed position;

15 Fig. 5 is an end elevational view showing the rail in a fully folded stored position;

Fig. 6 is a detail end elevational view showing a locking arrangement for the rail;

20 Fig. 7 is a side elevational view of the rail;

Fig. 8 is an end elevational view of the rail;

25 Fig. 9 is a detail end elevational view showing a locking arrangement for the rail;

Fig. 10 is a detail elevational view showing a pivot portion of the rail;

30 Fig. 11 is a detail elevational view showing another pivot portion of the rail;

Figs. 12-17 are various views illustrating a locking pin arrangement for a therapeutic bed of the invention;

Fig. 18 is a an elevational view showing one end of a therapeutic bed of the

invention incorporating a solenoid rotational interlock;

Fig. 19 is a detail side elevational view showing the mounting of the solenoid interlock on the bed;

5

Fig. 20 is an elevational view of the solenoid interlock;

Fig. 21 is a detail elevational view of portion of a therapeutic bed of the invention illustrating a hand-held controller for checking locking switches on the
10 bed;

Fig. 22 is a side sectional view showing the mounting of the controller on the bed;

15 Fig. 23 is a detail elevational view showing an end of the bed on which the controller is mounted;

Fig. 24 is a elevational view of a cam assembly for releasably locking patient support pads on a therapeutic bed of the invention;

20

Fig. 25 is a plan view of the cam assembly;

Fig. 26 is a side elevational view of the cam assembly;

25

Fig. 27 is an end elevational view of the cam assembly;

Fig. 28 is an end elevational view of the cam assembly;

30

Fig. 29 is a plan view of a safety catch assembly of a therapeutic bed according to the invention;

Fig. 30 is a sectional elevational view of the safety catch assembly;

Fig. 31 is a side elevational view of the safety catch assembly;

Figs. 32-34 are detail views showing portion of a bed frame of a therapeutic bed according to the invention; and

- 5 Figs. 35-39 are detail views illustrating portion of a therapeutic bed according to the invention incorporating rotational direction sensing means.

Referring to the drawings, and initially to Figs. 1 to 11 thereof, there is illustrated a side rail assembly indicated generally by the reference numeral 1 for a therapeutic bed according to the invention. The side rail assembly 1 is for mounting on a patient support platform and comprises a number of rail assemblies 1 mounted spaced-apart along opposite sides 3 of the patient support platform 2. Typically three or four of the rail assemblies 1 are mounted along each side of the patient support platform 2. Each side rail 1 is movable on the patient support platform 2 between an engaged position holding a patient support pad 4 spaced away from and facing patient support platform 2 through an intermediate position (Fig. 4) extending laterally outwardly of the patient support platform 2 and a stored position (Fig. 5) located beneath and against an underside of the patient support platform 2.

10 Each side rail assembly 1 has an inner rail part 6 and an outer rail part 7 connected by a pivot 8. The pad 4 is carried on a bracket 9 which hinges on the outer rail part 7 by means of a pivot pin 10. A bottom end of the inner rail part 6 is pivotally mounted by pivot 12 on the patient support platform 2. It will be noted that inner rail part 6 is cranked intermediate its ends. A pawl 14 mounted by pivot 15 on the patient support platform 2 has a slot 16 for engagement with associated teeth 17 on the inner rail part 6 to support the inner rail part 6 in either an upright engaged position (Fig. 3), an intermediate position (Fig. 4) extending outwardly from the patient support platform 2, or a stored position (Fig. 5) in which the rail assembly 1 is housed beneath the patient support platform 2. As can be seen in Figs. 1 and 4

15 when in the intermediate position the patient support pad 4 can be folded inwardly against the inner rail part 6 prior to storage beneath the patient support platform 2. A number of sensors 18 are provided and connected to a controller for a therapeutic bed on which the rail assembly 1 is mounted to indicate the position of the rail assembly 1 on the patient support platform 2 and indicate engagement of the pawl

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14.

Fig. 1 shows the side rail assembly 1 in all three positions of use and Figs. 3 to 5 show separately the side rail assembly 1 in the different positions of use.

5

In use, when a patient is supported in a supine position on the patient support platform 2 the rail assembly 1 can be stowed conveniently beneath the patient support platform 2. When it is necessary to turn the patient into a prone position, the rail assemblies 1 are swung into the engaged position and the pairs of patient 10 support pads 4 which are mounted on opposite sides of the bed are locked together by the straps as described in our previous application, publication number WO 99/62454.

Referring now to Figs. 12 to 17 there is illustrated a locking pin arrangement 15 indicated generally by the reference numeral 30 for a therapeutic bed of the invention.

This has the function of manually locking the patient support platform on the base frame as described in our patent applications. In this case the locking pin assembly 30 comprises a locking pin 31 mounted on the base frame and engagable with an associated receiver (not shown) on the patient support platform. The locking pin 31 is 20 longitudinally slidable between an extended engaged position as shown in Fig. 12 and a retracted disengaged position. A sensor actuator collar 32 is mounted on the locking pin 31 and secured thereto by a retaining pin 33. This sensor actuator 32 cooperates with associated sensors 34 to indicate whether the locking pin 31 is in the engaged locking position or in the released position. A pair of spaced-apart detents 25 35 are provided in the locking pin 31 and cooperate with a spring-loaded ball 36 to securely hold the locking pin 31 in either the engaged or released positions.

In use, the sensors 34 communicate with a controller for the bed to indicate whether 30 the locking pin 31 is engaged or released in order to block rotation of the patient support platform if the locking pin is engaged.

Referring now to Figs. 18 to 20 there is illustrated an arrangement of a prone release solenoid indicated generally by the reference numeral 40 for a therapeutic bed of the invention. The solenoid 40 is engagable between the patient support platform and

the base frame of the therapeutic bed and is connected to a controller for controlling rotation of the patient support platform on the base frame such that the patient support platform is prevented from rotating on the base frame until all the safety checks and protocols have been properly carried out to ensure that the patient is
5 properly secured on the patient support platform before rotation of the patient support platform into the prone position. These safety checks and protocols are described in WO 99/62454 and need not be repeated here.

Referring now to Figs. 21 and 22, a hand-held controller 50 for checking the buckles
10 which lock the pairs of patient support pads 4 on opposed side rails 1 is shown. This is mounted in a support clip 51 and can be removed by a nurse or the like to check the buckles in the required sequence to ensure the patient is secured on the patient support platform before rotating the patient support platform into the prone position.

15 Referring now to Fig. 23 there is shown an end casing forming portion of a therapeutic bed of the invention indicated generally by the reference numeral 60. This incorporates a touch screen assembly 61 for viewing data and for entering instructions to control rotation and positioning of the patient support platform.

20 Referring now to Figs. 24 to 28 there is shown a cam locking arrangement indicated generally by the reference numeral 70 for positioning and releasably locking patient support pads on the patient support platform such as the longitudinal support pads which extend down the side of a patient on the patient support platform. The cam
25 arrangement 70 comprises a carriage 71 which is slidably mounted between a pair of rails 72, 73 on the patient support platform. Locking strips 75 are mounted along a top of each rail 72, 73 and incorporate a series of spaced-apart grooves 76 which are engagable with associated projections 77 on an underside of the carriage 71 to securely retain the carriage 71 in any desired set position on the patient support
30 platform. A locking shaft 78 extends between the rails 72, 73 and projects upwardly through an opening 79 in the carriage 71. A flange 80 at a lower end of the locking shaft 78 is engagable with an underside of the rails 72, 73. A cam 81 is mounted by a pivot pin 82 at an upper end of the locking shaft 78 and can be moved by means of an actuating handle 83 to clamp or release the carriage 71 on the rails 72, 73.

An arm 85 on the carriage 71 carries the patient support pads at an outer free end thereof.

- Referring now in particular to Figs. 35 to 39, there is illustrated a rotational direction
5 sensor indicated generally by the reference numeral 90 for a therapeutic bed according to the invention. The direction sensor 90 has a rocker arm 91 with a central pivot 92 about which the rocker arm 91 pivots. Wings 93 at opposite ends of the rocker 91 are engagable with a stop 94 to define pivot limits for the rocker arm 91. A spring 95 holds the wing 93 at one end of the arm 91 against the stop 94.
10 The direction sensor 90 is mounted at one end of a therapeutic bed such that as the patient support platform rotates on the base frame an actuator on the patient support platform engages and flips over the rocker arm 91 which movement is detected by sensors 98 connected to a controller for the therapeutic bed to give an indication of the direction in which the patient support platform turns when moving
15 between a supine and a prone patient support position. Thus, when subsequently returning the patient support platform from the prone support position to the supine support position, the controller will reverse the drive to retrace the rotational path followed by the patient support platform.
20 The invention is not limited to the embodiments hereinbefore described which may be varied in both construction and detail.

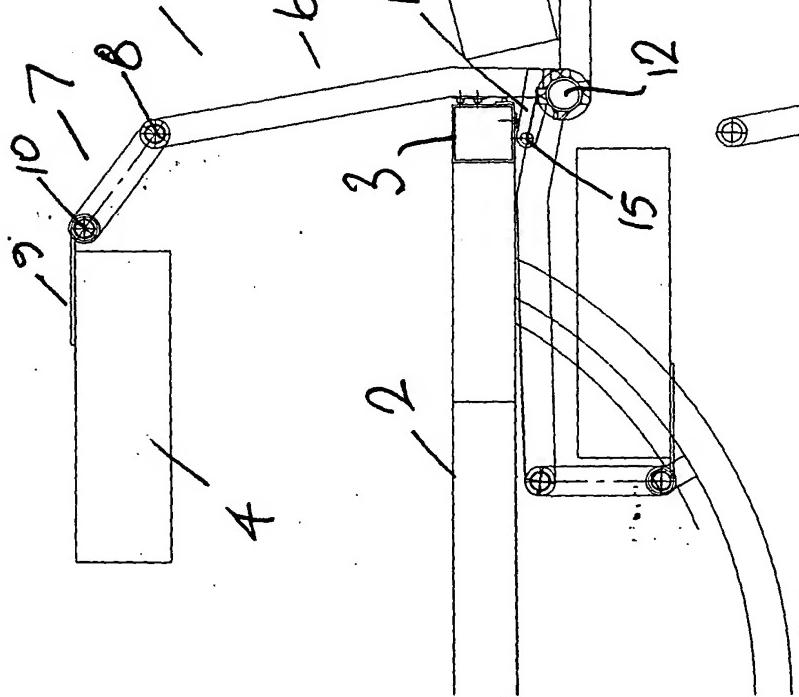


Fig 1

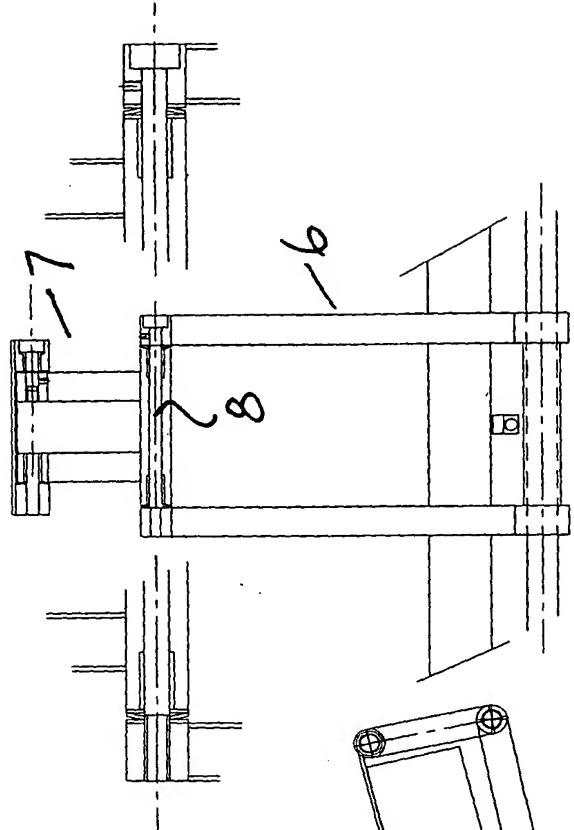


Fig 2

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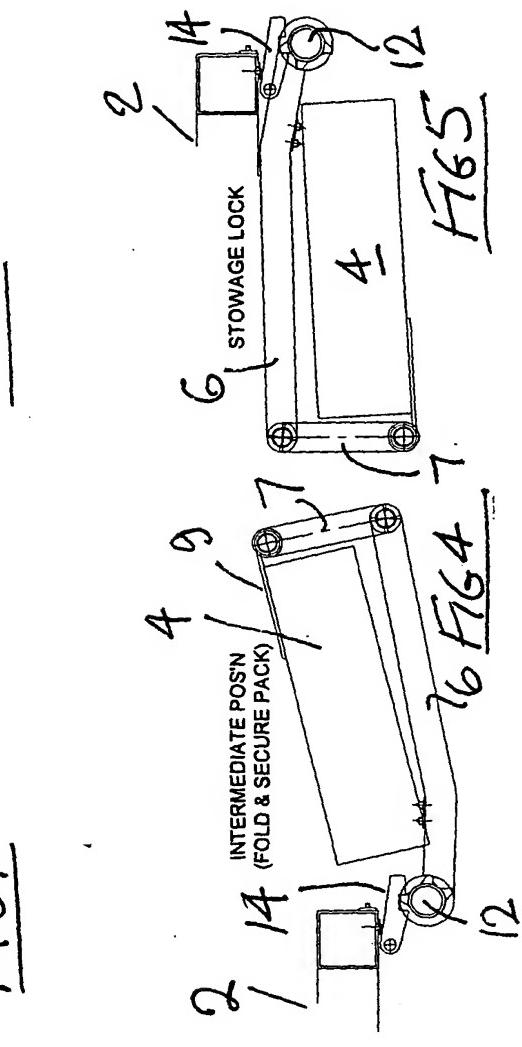


Fig 3

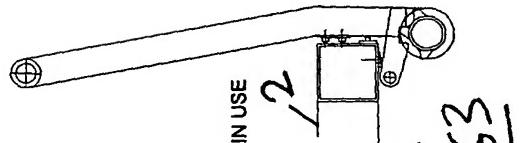


Fig 4

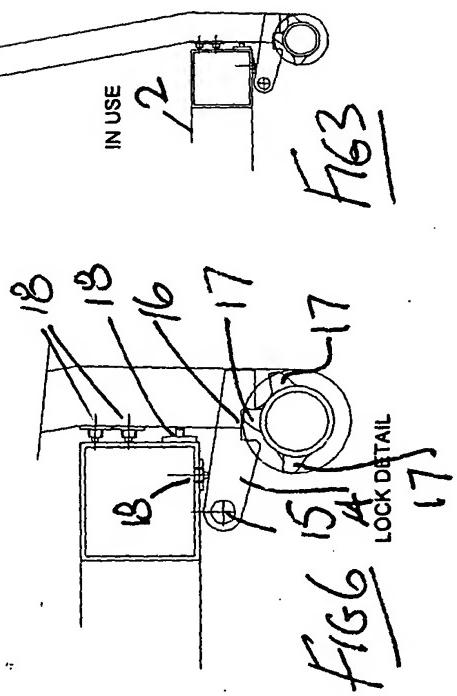
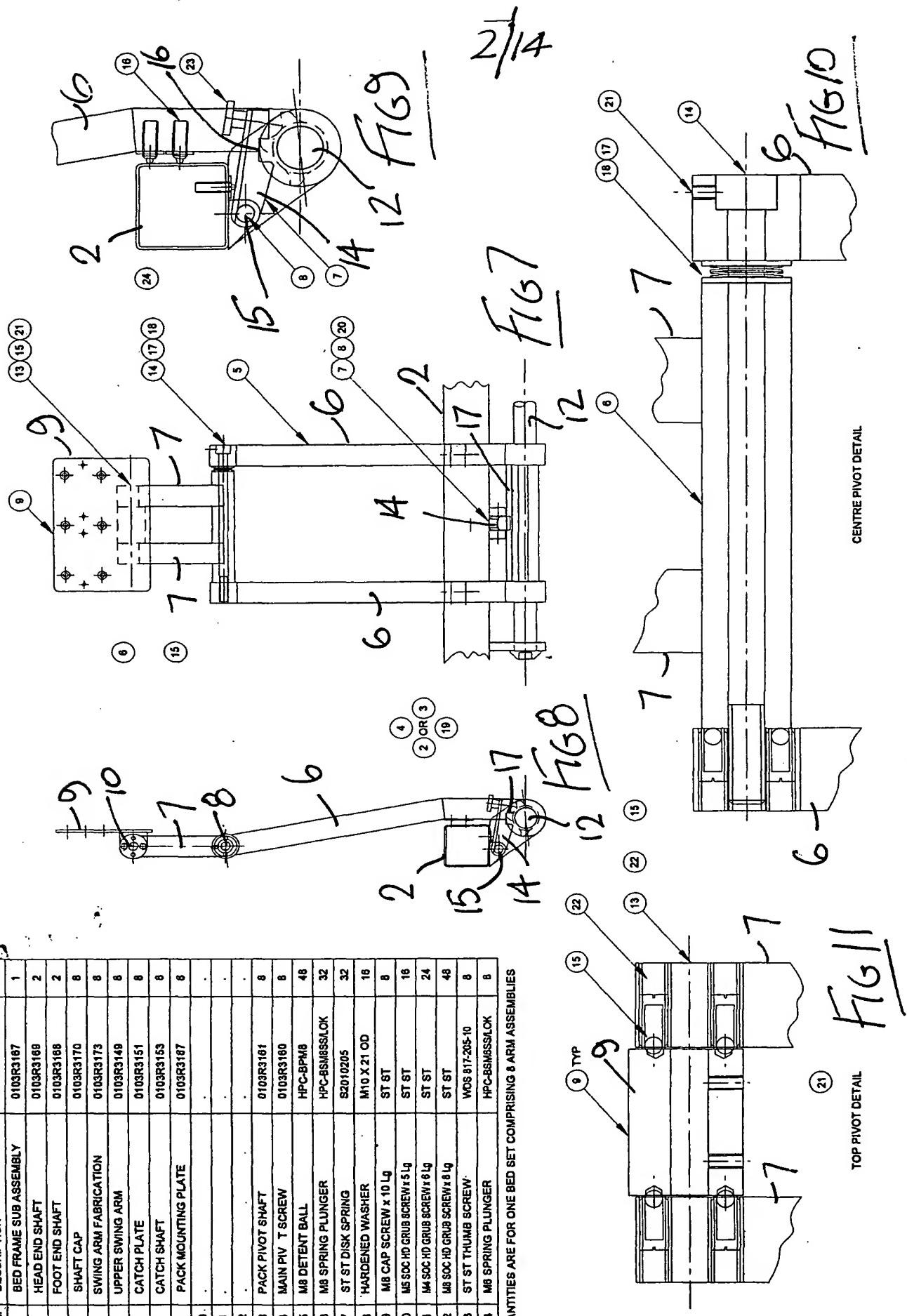


Fig 5

ITEM	DESCRIPTION	DRAWING NO	QTY
1	BED FRAME SUB ASSEMBLY	0103R3187	1
2	HEAD END SHAFT	0103R3188	2
3	FOOT END SHAFT	0103R3188	2
4	SHAFT CAP	0103R3170	6
5	SWING ARM FABRICATION	0103R3173	8
6	UPPER SWING ARM	0103R3148	8
7	CATCH PLATE	0103R3151	8
8	CATCH SHAFT	0103R3155	8
9	PACK MOUNTING PLATE	0103R3187	8
10	.	.	.
11	.	.	.
12	.	.	.
13	PACK PIVOT SHAFT	0103R3181	8
14	MAIN PIV T SCREW	0103R3180	8
15	M8 DETENT BALL	HPC-BPM8	48
16	M8 SPRING PLUNGER	HPC-BSMSSALOK	32
17	ST ST DISK SPRING	S2010205	32
18	HARDEDGED WASHER	M10 X 21 OD	16
19	M8 CAP SCREW x10 Lg	ST ST	8
20	M5 SOC HD GRUB SCREWS 5 Lg	ST ST	16
21	M4 SOC HD GRUB SCREWS 6 Lg	ST ST	24
22	M8 SOC HD GRUB SCREWS 8 Lg	ST ST	48
23	ST ST THUMB SCREW	WOS 817-205-10	8
24	M8 SPRING PLUNGER	HPC-BSMSSALOK	8



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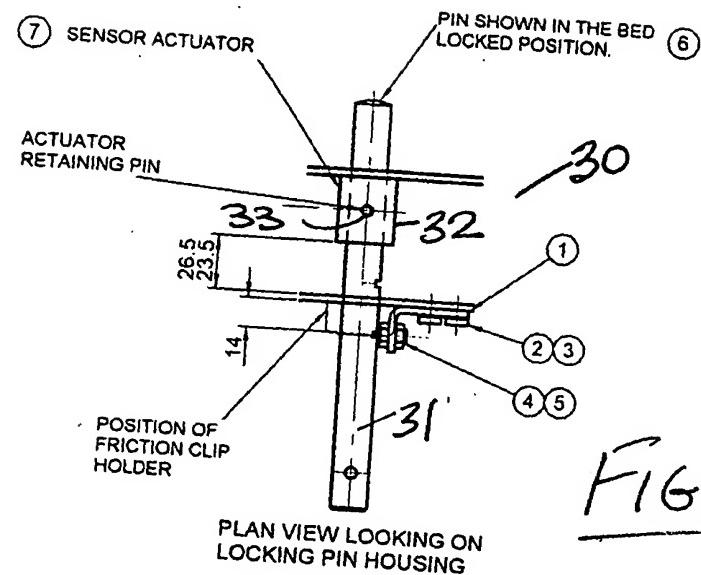


FIG12

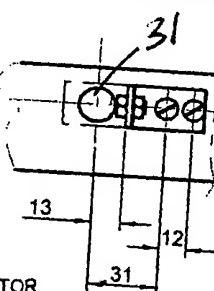


FIG13

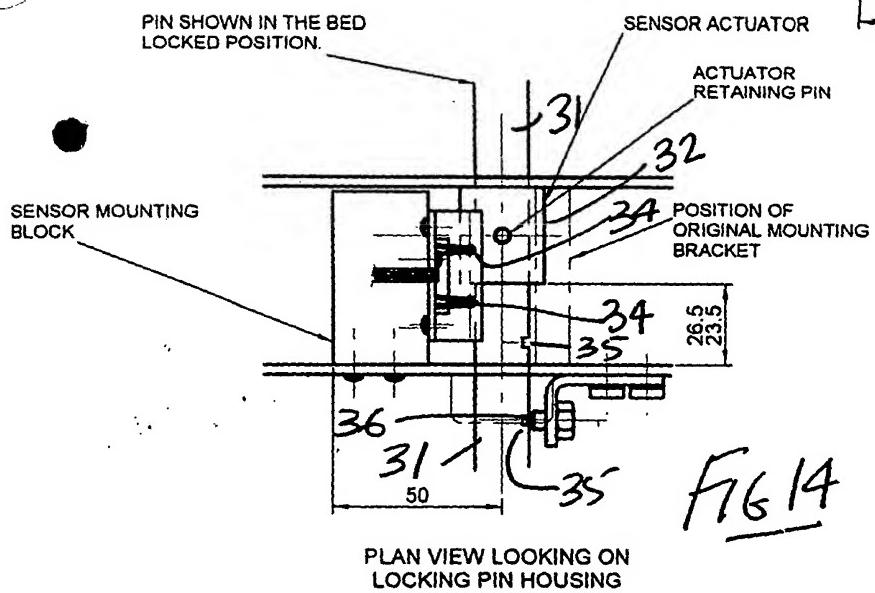


FIG14

CABLES POSITIONED
TO THE TOP

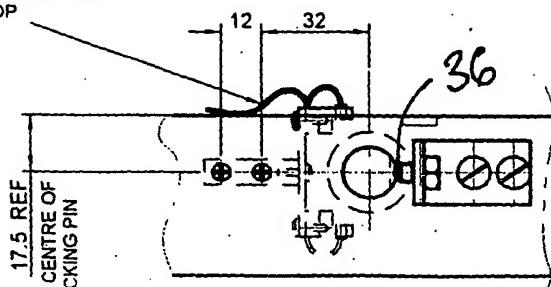
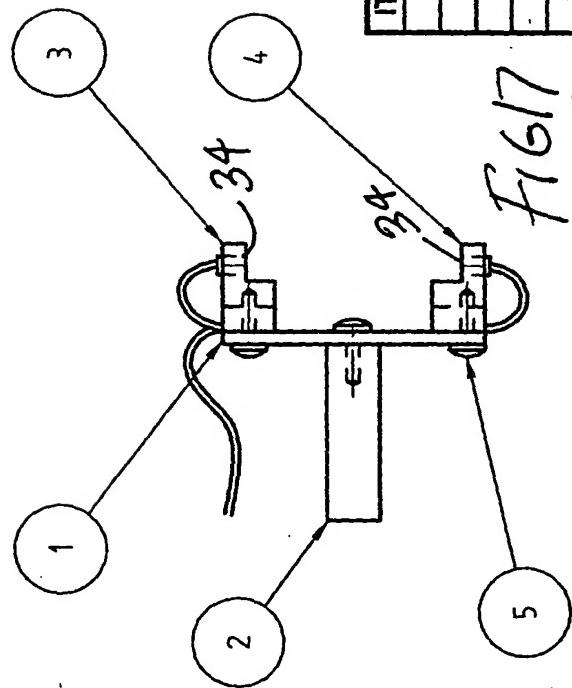
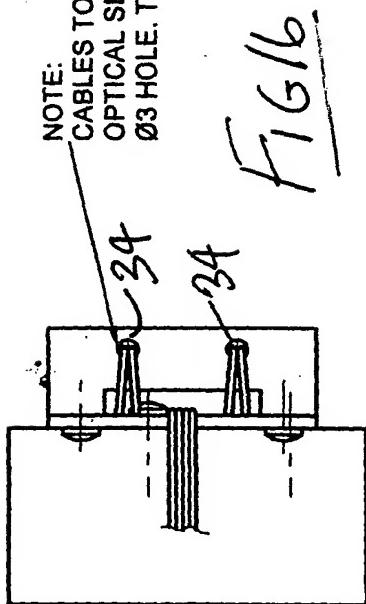


FIG15

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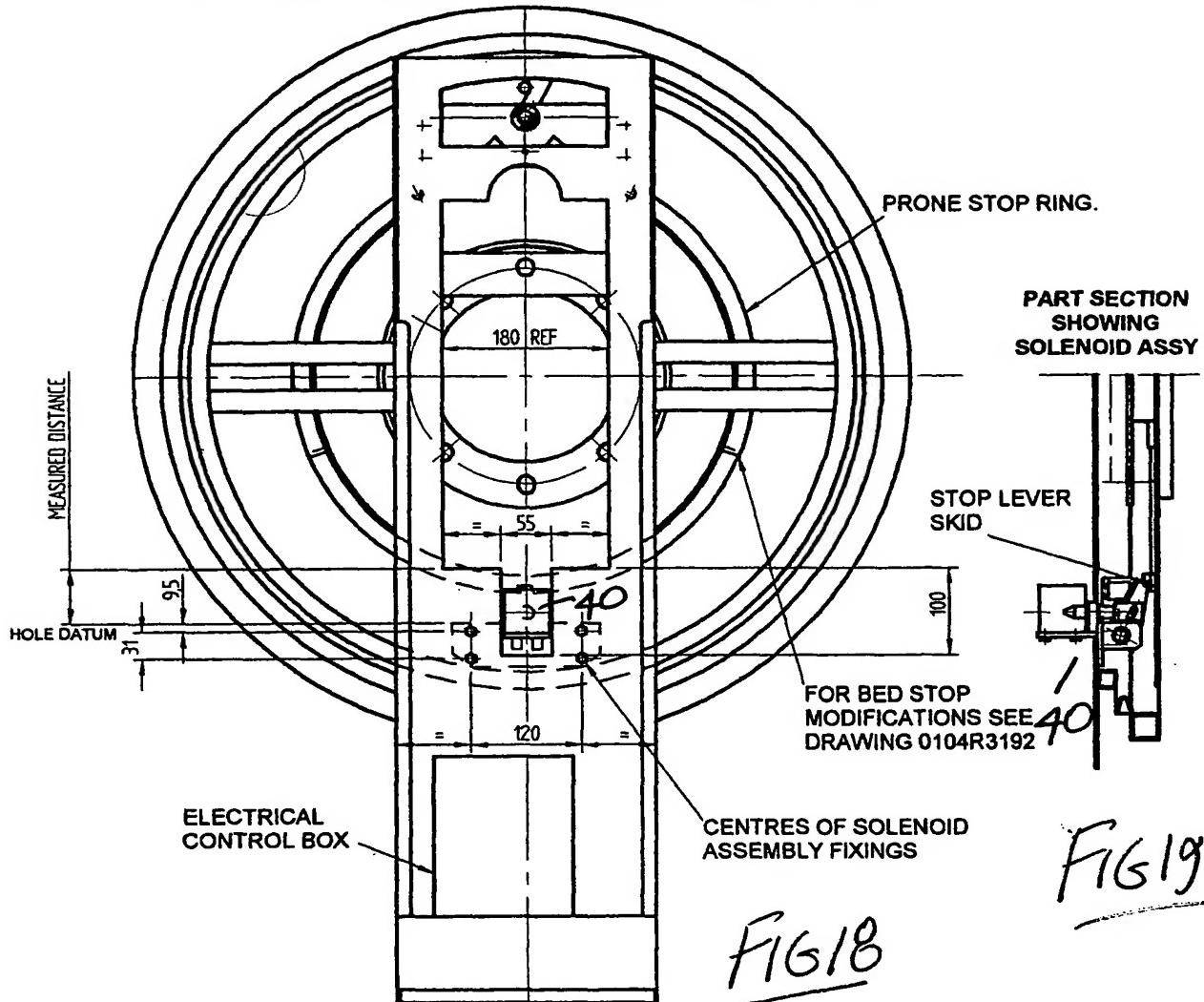
NOTE:
CABLES TO BE BENT ROUND AND
OPTICAL SENSOR PUSHED INTO
 $\varnothing 3$ HOLE, TYP OF 4 POSITIONS.



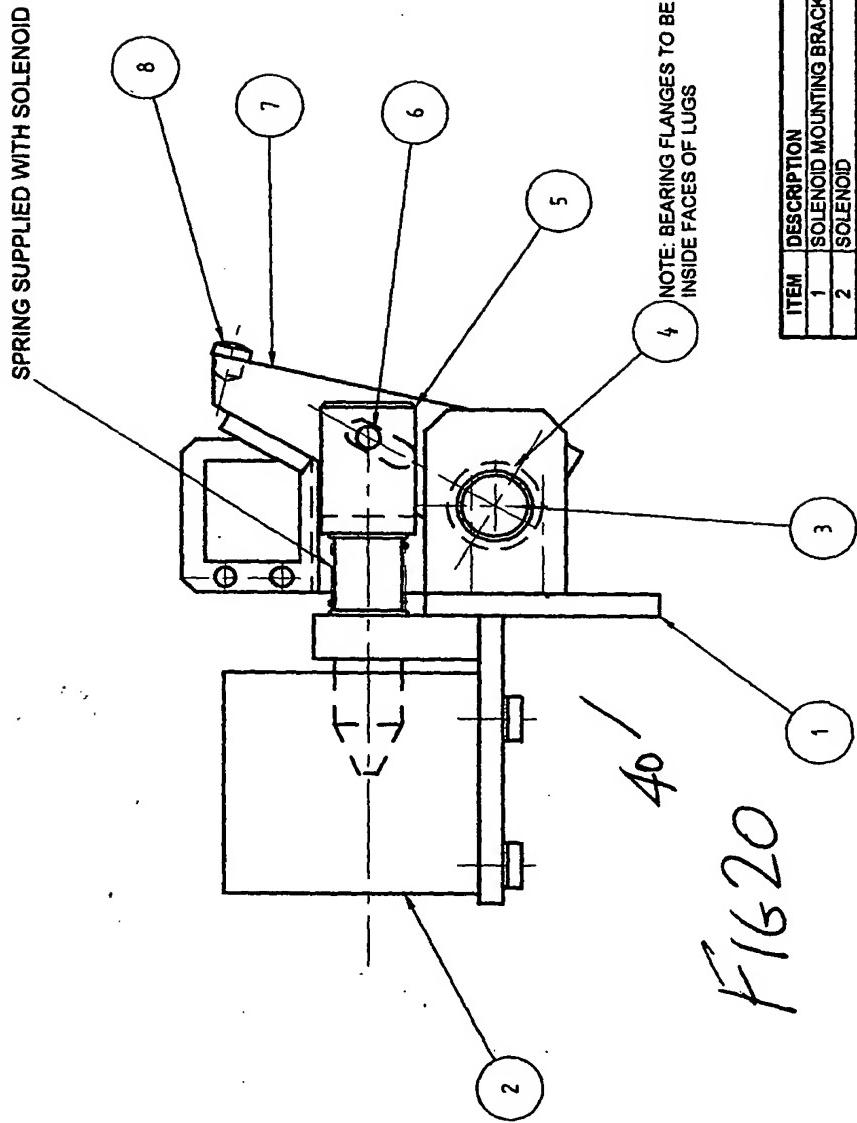
ITEM NO	DESCRIPTION	QTY	PART NO
1	MODIFIED CIRCUIT BOARD	1	0103R3092
2	SENSOR SUPPORT BLOCK	1	0103R3093
3	SENSOR SUPPORT CABLE SIDE	1	0103R3094
4	SENSOR SUPPORT	1	0103R3095
5	No4 x 1/4" SELF TAPPING SCREW	1	7271301

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VIEW LOOKING ON CONTROL PILLAR WITH VACFORMS REMOVED



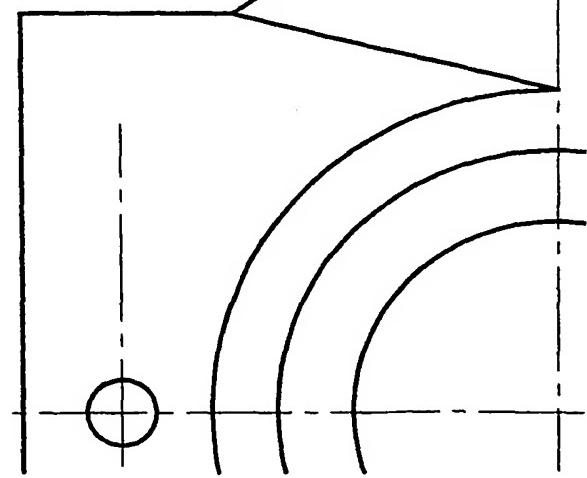
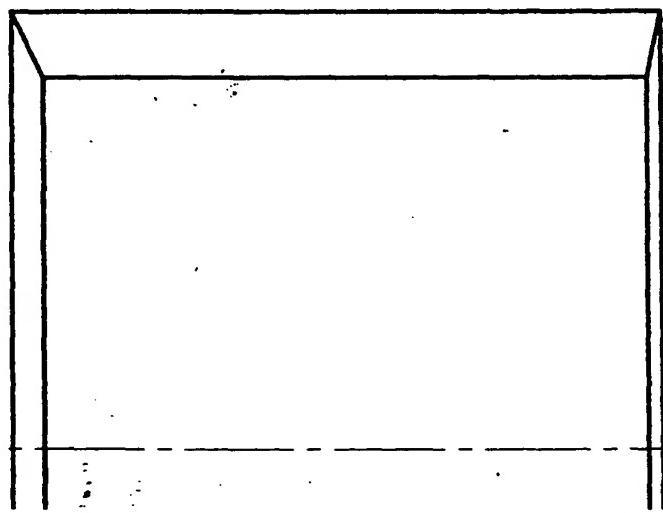
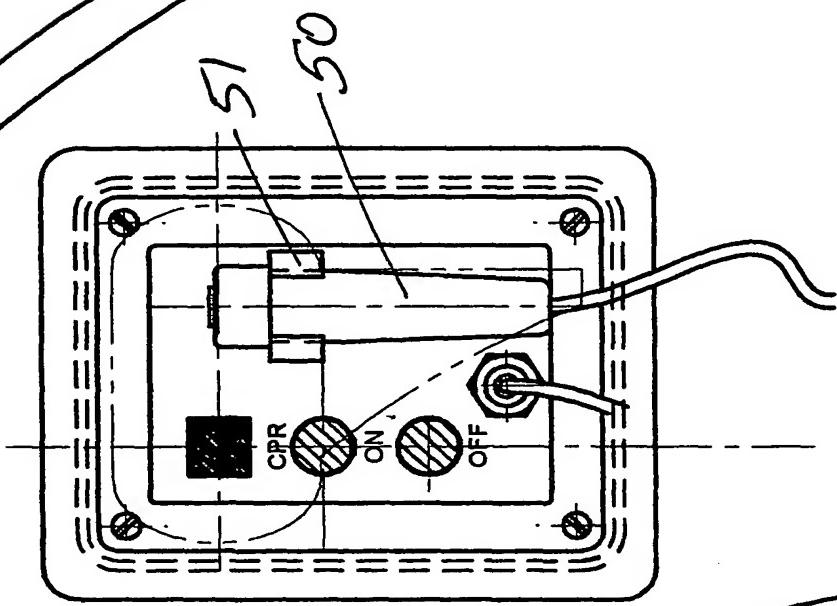
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ITEM	DESCRIPTION	QTY	PART No
1	SOLENOID MOUNTING BRACKET	1	0102R3060
2	SOLENOID	1	EXISTING
3	HINGE PIN	1	0012R3017
4	FLANGED BEARING (GLACIER FMB1209DU FLDG)	2	4377043
5	SOLENOID ACTUATING PIN	1	0102R3059
6	SPRING TENSION PIN	1	7256508
7	STOP LEVER	1	0102R3060
8	LEVER SKID	1	0102R3072
9			
10			
11			
12			

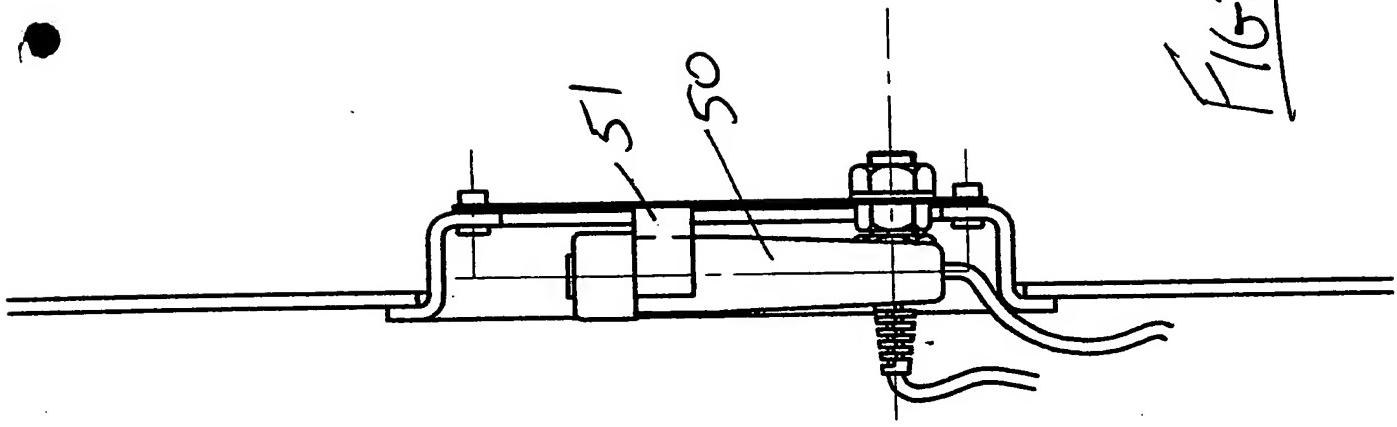
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Fig 21



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Fig 22



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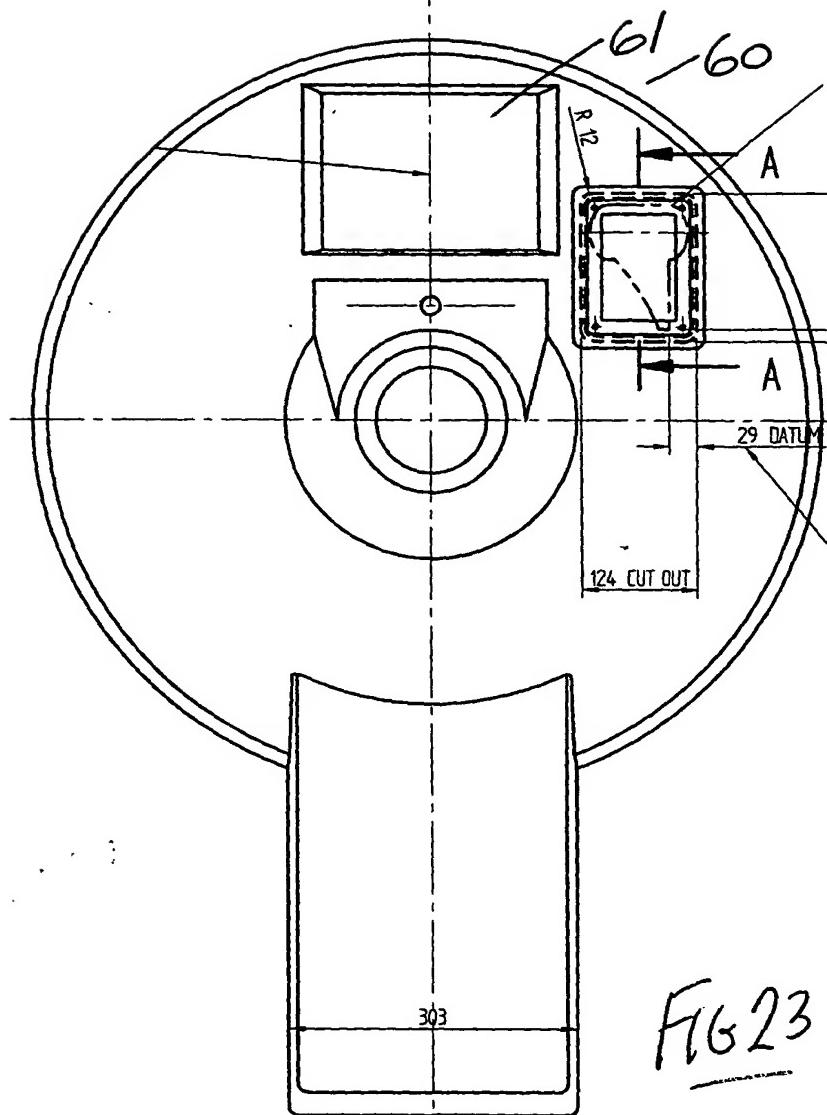
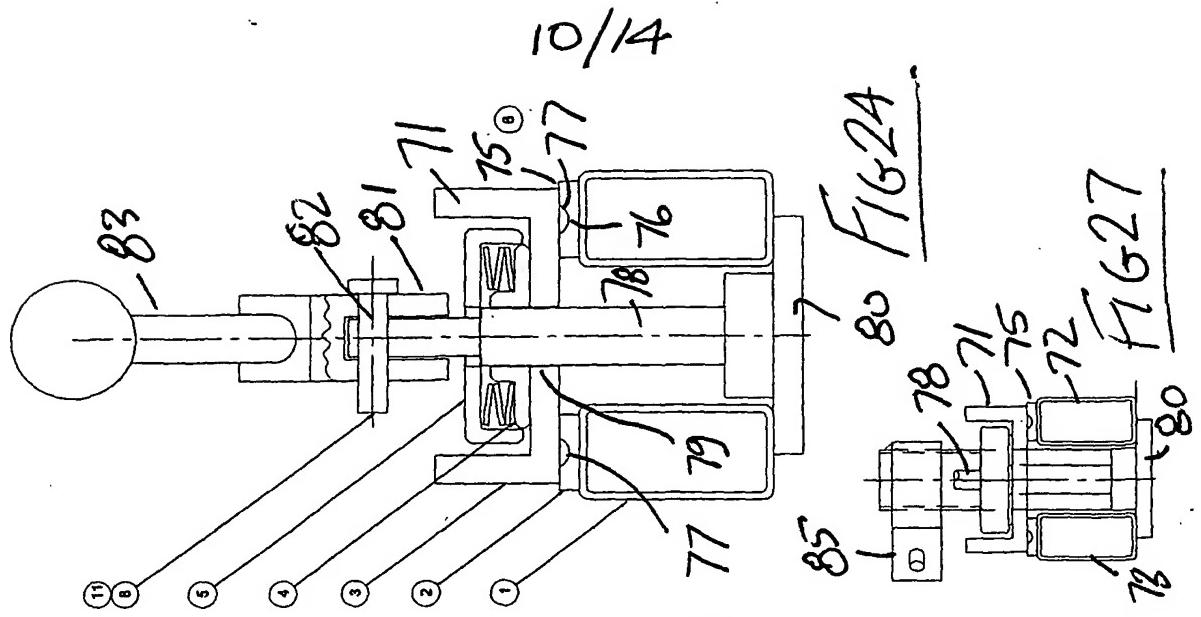
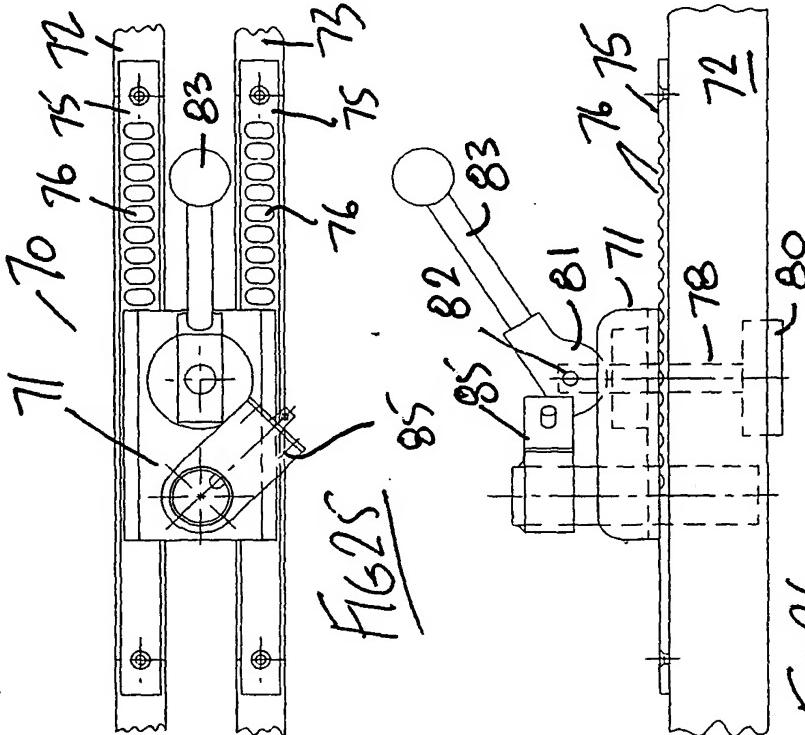
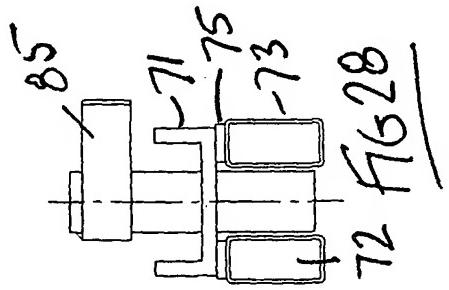
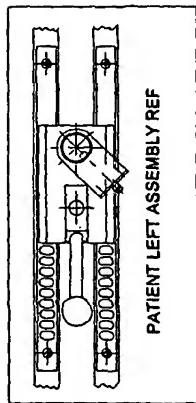


FIG 23



ITEM	DESCRIPTION	DRAWING NO	QTY
1	BED FRAME (REF)		1
2	RACK	0105R3202	1
3	BASE	0105R3203-RHLH	1
4	SPRING HOLDER	0105R3204	1
5	SPRING HOUSING	0105R3205	1
6	PIN SUB-ASSY	DR-SAY-10	1
7	CAM LEVER	exist	1
8	CAM PIN	exist	1
9	DISK SPRING		1
10	CATCH SUB-ASSY	0105R3197	1
11	SPLIT RING #1.25 WIRE	ST ST	1
12			

**QUANTITIES FOR 1 ASSEMBLY.
2 ASSEMBLIES REQUIRED
1 OFF RH, 1 OFF LH
PATIENT RIGHT DRAWN**



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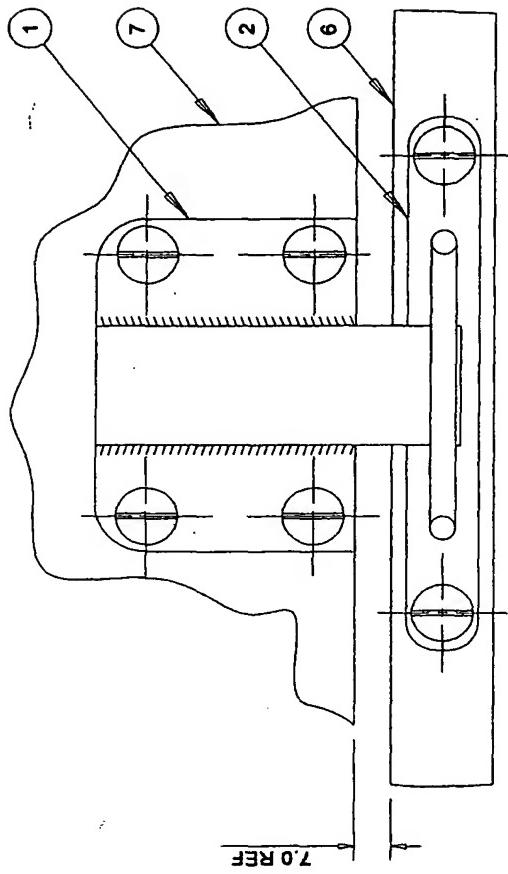


FIG 29

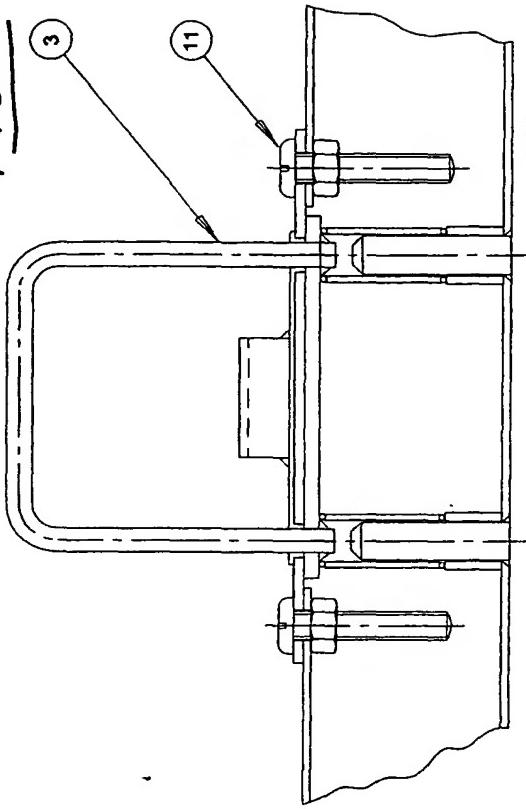


FIG 30

ITEM	QTY	DESCRIPTION	DRAWING NO
1	1	CATCH PLATE	0103R3125
2	1	COVER PLATE	0103R3126
3	1	ROCKER CATCH BAR	0103R3127
4	2	SPRING (ST ST)	CD2221 (HPC)
5	2	SPRING SPACER	0103R3128
6	1	BED FRAME SUB ASSY	0103R3129
7	1	BACK PACK SUB ASSEMBLY	0103R3131
8	2	PACK SPACER	0103R3132
9	2	M5 PAN HD SCREW x 20 Lg	ST ST
10	2	M5 PAN HD SCREW x 12 Lg	ST ST
11	2	M5 PAN HD SCREW x 30 Lg	ST ST
12	2	PACK REAR SPACER	0103R3166

SPRING DETAILS :-

D11.25 x Ø8.75 x Ø1.25 WIRE
MATERIAL :- ST ST
FREE LENGTH :- 29.5mm
RATE :- 3.76 N/mm

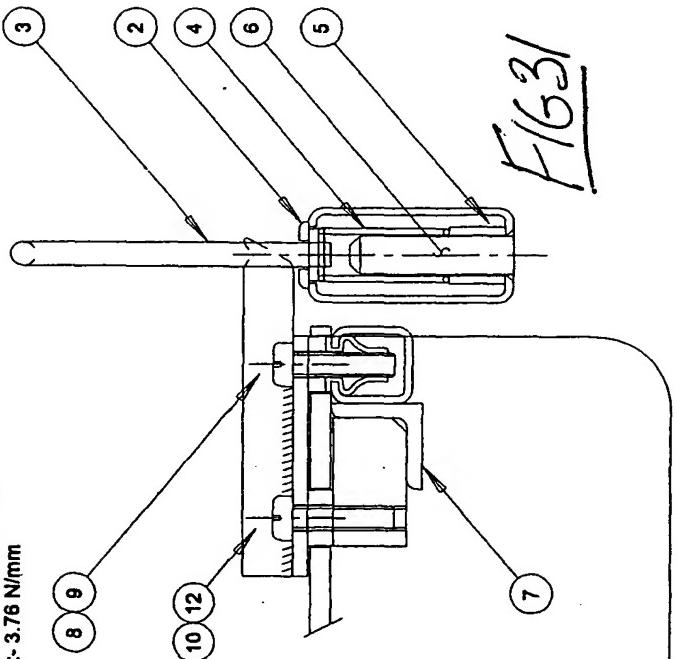
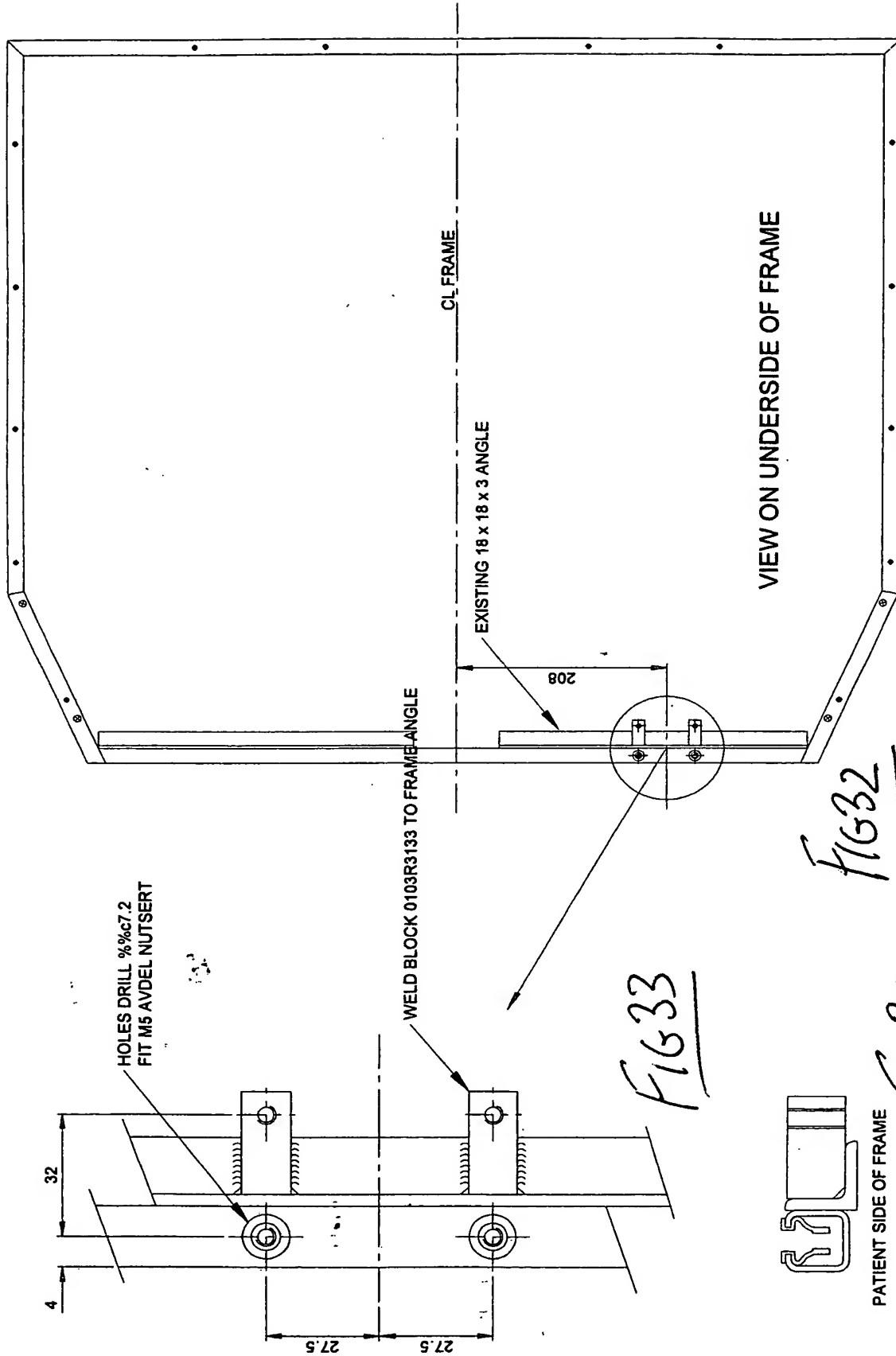


FIG 31

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PATIENT SIDE OF FRAME

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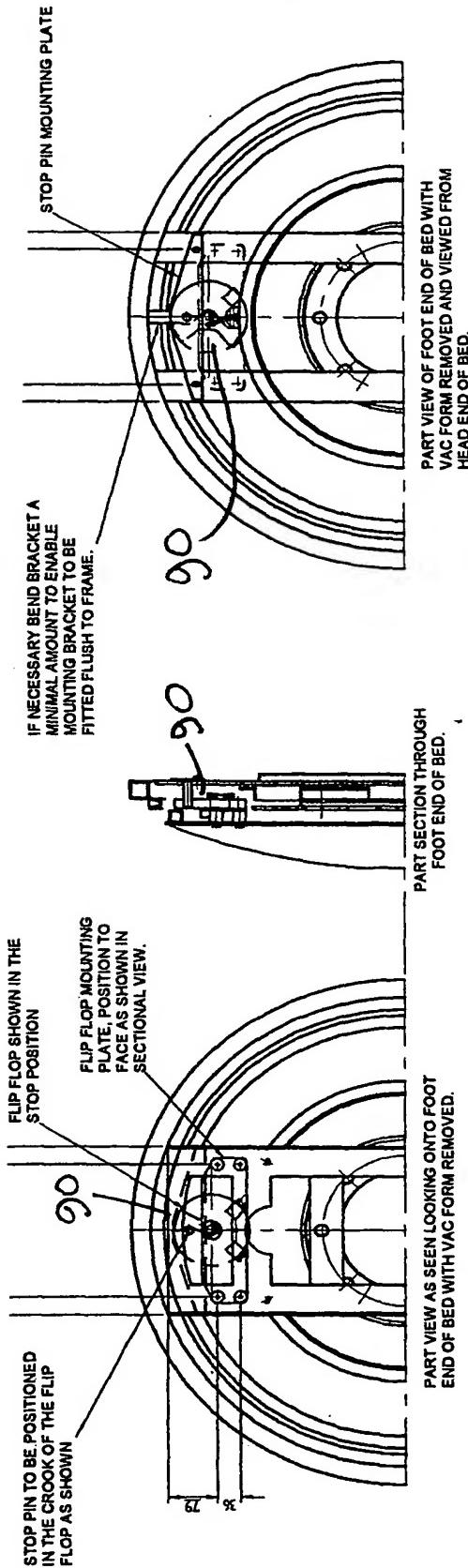


Fig 35

Fig 36

Fig 37

FIG. 3

FIG. 2

FIG. 1

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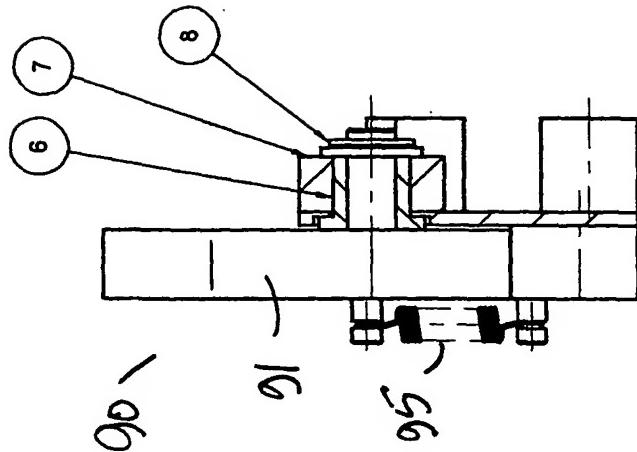


Fig 39

ITEM	DESCRIPTION	QTY	PART No
1	BRACKET	1	0102R3053
2	FLIP FLOP	1	0102R3054
3	SPRING RETAINING PIN	2	0011R2961
4	EXTENSION SPRING S. SRS No 821-475	1	E4868524
5	FLIP FLOP STOP	1	0011R2959
6	OLITE FLANGED BEARING AMF10 x 16 16	1	E4377042
7	M10 WASHER	1	7264943
8	CIRCLIP SHAFT SIZE 10mm B.S. REF S010M	1	E4302422
9	M6 x 12LG SKT HD CAP SCREW	1	7273755
10	M6 SPRING WASHER	1	7265024

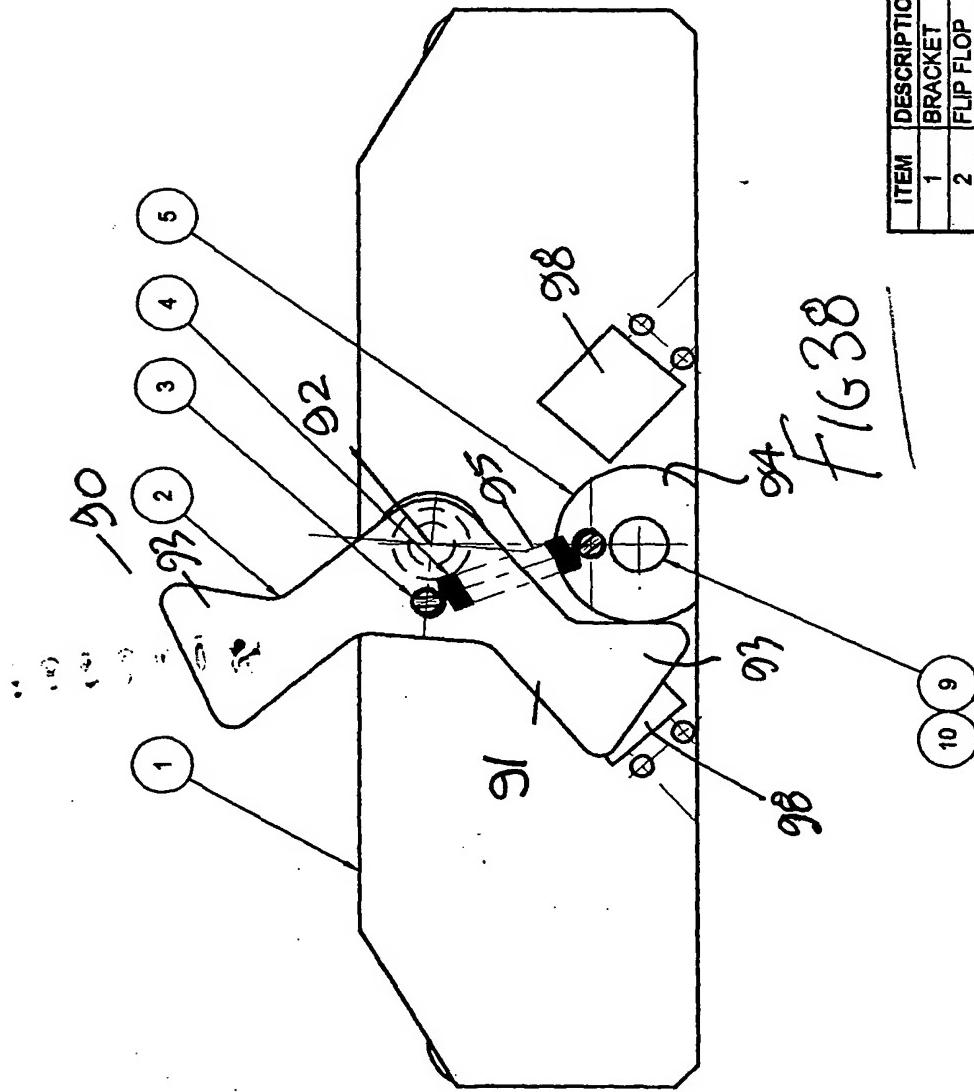


Fig 38